Technical Notes

Registration. The reporting of Kansas vital events to the Kansas Department of Health and Environment (KDHE) is mandated by law (K.S.A. 65-102). The filing of birth and death records was begun in 1911 and the registration of marriages and divorces was initiated in 1913 and 1951 respectively. Certificates of births, deaths, fetal deaths, marriages, marriage dissolutions, and reports of abortions are completed by the combined efforts of physicians, hospital personnel, funeral directors, and local courts. All certificates and reports are filed with the Office of Vital Statistics by direct reporting. Since registration of vital events began, over ten million records have been processed, filed and indexed.

Quality of Data. The quality of the analyses in the Annual Summary of Vital Statistics depends on the accuracy of the Kansas vital statistics data. The Office of Vital Statistics makes every effort to ensure the completeness and accuracy of the certificates filed. An interchange agreement with all 50 states and Canada ensures that vital events occurring to Kansas residents in other states or Canada are recorded. Tabulation of vital events for 2001 in-state occurrences is maintained through March 15, 2002, while out-of-state occurrences are maintained through May 1, 2002. Reports filed later consist of less than one percent of the total reports filed, are considered negligible, and are omitted from this report.

Data Quality Assurance Survey: Kansas Birth Registration, prepared by Fred Gatlin and Greg Crawford of KDHE's Center for Health and Environmental Statistics, compared birth certificate information to hospital medical records and surveyed hospital birth clerks to assess vital record data quality issues. This report at http://www.kdhe.state.ks.us/ches/index.html#research enables staff to focus on areas to improve data quality.

Residence vs Occurrence Data. Residence data is information compiled according to the usual residence regardless of where the event occurred (including events occurring out-of-state). Occurrence data is information compiled according to the geographical location where the event took place, regardless of the actual residence. Information compiled for births, fetal deaths, deaths and abortions in this report are residence data, while marriages and marriage dissolutions are occurrence data.

Peer Groups. For various demographic studies, it is useful to consider groups of counties with similar characteristics. "Peer Groups" of counties, as used in this summary, are defined as those with similar population density based on their 2000 actual census counts. In order to facilitate a time series comparison the assignment of counties to their peer group remains unchanged until the next decennial census. They will not necessarily have similar values for any other indicators. Frontier counties are defined as those with less than 6.0 persons per square mile, Rural counties as those with 6.0 - 19.9 persons per square mile,

Technical Notes (Cont.)

Densely-Settled Rural counties as those with 20.0 - 39.9 persons per square mile, Semi-Urban counties as those with 40.0 - 149.9 persons per square mile, and Urban counties as those with 150.0 or more persons per square mile. These definitions originated with the Kansas Department of Health and Environment, Office of Local and Rural Health, and should *not* be confused with the U.S. Census Bureau's definitions of urban and rural areas. Sources for calculation of population densities are population figures from the 2000 U.S. Census and land areas from the 2000 U.S. Census.

Counties are grouped in population density peer groups as follows:

Frontier
Barber
Chase
Cheyenne
Clark
Comanche
Decatur
Edwards
Elk
Gove
Graham
Greeley
Hamilton
Hodgeman
Jewell
Kearny
Kiowa
Lane
Lincoln
Logan
Meade
Morton
Ness
Osborne
Rawlins
Rush
Sheridan
Smith
Stanton
Trego
Wallace
Wichita

Rural
Anderson
Brown
Chautauqua
Clay
Cloud
Coffey
Ellsworth
Grant
Gray
Greenwood
Harper
Haskell
Jackson
Kingman
Linn
Marion
Marshall
Mitchell
Morris
Nemaha
Norton
Ottawa
Pawnee
Phillips
Pratt
Republic
Rice
Rooks
Russell
Scott
Sherman
Stafford
Stevens
Thomas
Wabaunsee
Washington
Wilson
Woodson

Densely-Settled Rural
Allen
Atchison
Barton
Bourbon
Cherokee
Cowley
Dickinson
Doniphan
Ellis
Finney
Ford
Jefferson
Labette
Lyon
McPherson
Neosho
Osage
Pottawatomie
Seward
Sumner

Semi-Urban
Butler
Crawford
Franklin
Geary
Harvey
Miami
Montgomery
Reno
Riley
Saline

Urban
Douglas
Johnson
Leavenworth
Sedgwick
Shawnee
Wyandotte

Population. State and county population estimates for 1997-1999 were obtained from the U.S. Bureau of the Census (U.S.C.B.) on the Internet at: http://eire.census.gov/popest.

Technical Notes (Cont.)

City population estimates for 1997-1999 were derived by the KDHE as in the following example for 1999:

$$\text{1999 City Population} = \frac{\text{City Population, 1998}}{\text{County Population, 1998}} \times \text{1999 County Population}$$

Actual population counts from the U.S.C.B. were obtained for 2000 on the internet at http://www.census.gov/main/www/cen2000.html. Population estimates for 2001 by the U.S.C.B. and certified by the Kansas Division of the Budget were obtained on the internet at: http://da.state.ks.us/budget/ecodemo.htm.

Population estimates by age-group and sex for 1991-1992 were obtained from the U.S. Bureau of the Census, Press Release CB92-93 and CB92-276, respectively. Population estimates for 1993-1996 were obtained from the Census and You, Vol. 29, No. 4, April 1994, Vol. 30, No. 4, April 1995, Vol. 31, No. 3, March, 1996 and Vol. 32, No. 7, July, 1997 U.S.C.B., respectively. Population estimates for 1997-1999 were obtained on the internet at: http://eire.census.gov/popest/archives/1990.php. Population counts for 2000 were obtained on the internet at http://www.census.gov/main/www/cen2000.html. These numbers were used in age-specific and age-adjusted calculations. Population by age-group and sex was not available from the U.S.C.B. for 2001 and was estimated by the Kansas Department of Health and Environment based on 2000 U.S. Census Bureau numbers.

Due to rounding and variation in estimation methods within the U.S. Census Bureau, some discrepancies may be found in population data. (Table 2 and Table 4) Usually differences are negligible and rarely result in discrepancies in the totals. We advise you to utilize state totals from the county population totals when a total population estimate is needed.

Female Population 10-19. Estimates of the Kansas female population for 1991-1999 were obtained from the U.S. Bureau of the Census, and actual population counts were used for 2000.

The 2001 state and county estimates for teenage females (10-14, 10-17, 15-19, 10-19) were compiled by the Kansas Department of Health and Environment based on 2000 U.S. Census Bureau numbers. In order to estimate the 2001 teenage female population for the various age groupings, the 2000 proportion for the age grouping within the total population had to be derived. These estimates were calculated as in the following example for 2001.

$$\frac{\text{Female Population 10-14 Year Age Group (2000)}}{\text{2000 Population All Ages}} \times \text{2001 Population All Ages} = \text{10-14 Year Age-Group (2001)}$$

Technical Notes (Cont.)

Deaths. Underlying causes of death in the 2000 Annual Summary of Vital Statistics are established through a system known as the International Classification of Diseases, 10th Revision (ICD-10). This system promotes uniformity and comparability in the collection and presentation of mortality or death data. Prior to 1999, Kansas used ICD-9 to report mortality statistics.

Periodically the classification system needs to be updated to address new diseases and reflect a better understanding of causes of death. The World Health Organization maintains ICD-10 and the National Center for Health Statistics (NCHS), which compiles national statistics, modifies ICD-10 for use by Kansas and other states.

One of the challenges in the conversion to a new classification system is comparability with statistics compiled under the old system. Because so much has changed, exact comparison is not possible. Not only have the number of causes of death doubled to over 8,000, but the rules of how a death is coded have changed. Greater knowledge of diseases like Alzheimer's and diabetes has resulted in coding rules changes that will increase the number of cases reported. The rules changes may also lower the number of deaths classified as pneumonia and influenza. Death data from 1999 forward are classified by ICD-10, and trends in mortality will be comparable.

Age-Adjusted Death Rates. Mortality rates, the number of deaths per 100,000 population, are a common way to report death statistics so that comparisons can be made from year to year or among geographic areas. Crude death rates compensate for the differences in population within the areas or time periods studied. Crude death rates, however, do not compensate for the different make up of compared populations. For example, some Kansas counties may have more older residents than other counties. To address this, statisticians prepare age-adjusted death rates. The direct method for calculating age-adjusted death rates was used in this report. Age-adjusting is a process by which the age composition of a population is defined as constant so that differences in age composition can be eliminated from the analysis. This is needed because older populations have higher death rates, merely because death rates increase with age. Age-adjusted rates allow for more meaningful comparison of the risk of mortality over time and among groups.

For decades Kansas and many other states have used the 1940 standard population for age-adjusting. Other states have used a 1970 or 1980 population standard. Moving to a 2000 population standard, as recommended by NCHS, will eliminate confusion and misunderstanding created by the use of various population standards. Age- adjusted rates calculated using the 1940 population standard can't be compared to rates created using the 2000 standard. Since the benefit from age-adjusting rates comes only from using the same population standard, comparison between different standards would produce misleading results. Kansas began using the 2000 population standard in the 1999 Annual Summary of Vital Statistics. As part of its implementation of the new age-adjusting population

standard, the Center for Health and Environmental Statistics (CHES) produced the report *Age Standardization of Kansas Death Rates: Implications of the Year 2000 Standard.* Copies can be obtained at the CHES Web site http://www.kdhe.state.ks.us/ches/.

Years of Potential Life Lost (YPLL). The YPLL, for this report, is a measurement of the number of years of potential life lost by each death occurring before the average life expectancy. This calculation provides more information on the societal impact of mortality. Years of life lost counts deaths at a younger age more heavily than those at older ages (e.g., the younger person has a greater potential for years left than an elderly person). YPLL were calculated by subtracting mid-point years of the 5-year age-groups from life expectancies for all Kansans and male and female Kansans as compiled by the Kansas Division of the Budget-State Demographer. The subtraction leaves a remainder - the years of potential life lost, which is then multiplied by the number of deaths in that particular age-group and subsequently all calculations for the five-year age-groups beginning with 0-4 and through over 85 are summed to provide the total years of life lost. In making the calculations, the age-groups with mid-points larger than the life expectancy were set to zero because they would not contribute years of life lost (e.g., they are over the life expectancy). For this report, the life expectancy for all Kansans is 77.11 years, males 73.61 and females 80.51 years.

Rate Reliability. Vital statistics are easily influenced by random variation and single-year rates can fluctuate from year to year. A multiple-year rate such as a five- or ten- year average of single-year rates would be more accurate in formulating conclusions on vital events. For example, between 1997 and 2001 the infant death rate for Kansas ranged from 6.7 to 7.4, while the 1997-2001 five-year infant death rate for Kansas was 7.1 infant deaths per 1,000 live births. A five or ten-year rate smooths some of the variation in single-year rates and would be a more reliable indicator of infant death rates in Kansas.

Rates based on a small or large number of events in a sparsely populated area can vary widely. To exemplify the variation that may occur with a small change in the number of events, in 2001 Greeley county was the least populated county in Kansas with 1,503 residents and Johnson county was the largest with 465,058 residents. With 15 deaths occurring in Greeley county in 2001, the crude death rate was 10.0 deaths per 1,000 population; whereas 2,855 deaths occurring in Johnson county resulted in a crude death rate of 6.1 deaths per 1,000 population. If five more deaths occurred in each county (e.g., multiple- death accident), Greeley county's crude death rate would have increased to 13.3, while Johnson county's rate would have increased by only a few hundredths and, with rounding, still remain 6.1 deaths per 1,000 population. Therefore, one must use caution when comparing rates of vital events between counties of extreme population size differences to avoid misleading conclusions.

Limitations of Pregnancy Outcome Data. Prior to 1994, all births occurring at Irwin Army Hospital to Ft. Riley residents were recorded for Geary county even when Riley was the county of residence. Beginning in 1994, these births are recorded to the appropriate county of residence.

Technical Notes (Cont.)

From July,1970 through June,1995, only hospitals in Kansas were required by K.S.A. 65-445 to keep and submit to the Secretary of the Department of Health and Environment written records of all pregnancies terminated in the hospital. During this reporting period, nonhospital providers reported terminations only on a voluntary basis. Although Kansas had a comprehensive coverage of providers, there could have been a small number of abortions not reported. This means that the data may have been, to a certain degree, underreported. However, effective July 1, 1995, the Kansas legislature amended K.S.A. 65-445 in Senate Bill 384 to broaden the record-keeping and reporting requirement to include every medical care facility and every person licensed to practice medicine and surgery.

Criteria for the Adequacy of Prenatal Care Utilization (APNCU) INDEX.

I. Month prenatal care began (Adequacy of Initiation of Prenatal Care)

Adequate Plus: 1st or 2nd month
Adequate: 3rd or 4th month
Intermediate: 5th or 6th month
Inadequate: 7th month or later, or no prenatal care

II. Proportion of the number of visits recommended by the American College of Obstetricians and Gynecologists (ACOG) received from the time prenatal care began until delivery (Adequacy of Received Services)

Adequate Plus: 110% or more
Adequate: 80% - 109%
Intermediate: 50% - 79%
Inadequate: less than 50%

III. Summary Adequacy of Prenatal Care Utilization Index

Adequate Plus: Prenatal care begun by the 4th month and 110% or more of recommended visits received
Adequate: Prenatal care begun by the 4th month and 80% - 109% of recommended visits received
Intermediate: Prenatal care begun by the 4th month and 50% - 79% of recommended visits received
Inadequate: Prenatal care begun after the 4th month or less than 50% of recommended visits received

The bibliographic reference relating to this index is: Kotelchuck, Milton. "An Evaluation of the Kessner Adequacy of Prenatal Care Index and a Proposed Adequacy of Prenatal Care Utilization Index.", American Journal of Public Health, 1994; 84(9): 1414-1420.

Handling of Unknowns. Items for which no response was provided are shown as "not stated" (N.S.) in the tables and graphs throughout this publication. To ensure the accuracy of the data, the "not stated" have been removed from totals when calculating percentages.

DEFINITIONS

The following terms, formulas and symbols are defined for more meaningful interpretations of the data contained in this report.

Abortion (induced termination of pregnancy):	The purposeful interruption of pregnancy with the intention other than to produce a live-born infant or to remove a dead fetus and which does not result in a live birth.
Adequacy of Prenatal Care Utilization (APNCU) Index:	An assessment of the adequacy of prenatal care measured by the APNCU Index (often referred to as the Kotelchuck Index), a composite measure based on gestational age of the newborn, the trimester prenatal care began, and the number of prenatal visits made.
Annulment:	The invalidation of a marriage contract.
Birth Weight:	The weight of the fetus or infant at the time of delivery.
Cause of Death:	The underlying cause of death, or that condition giving rise to the chain of events leading to death.
Congenital Anomalies:	Defects existing at and usually before birth regardless of causation.
Divorce:	The dissolution of a legally binding marriage contract.
Fetal Death:	Any complete expulsion or extraction from its mother of a product of human conception, the weight of which is in excess of 350 grams, irrespective of the duration of pregnancy, resulting in other than a live birth, and which is not an induced termination of pregnancy.
Hebdomadal Death:	The death of a live-born infant which occurs prior to the seventh day of life.
I.C.D. Code:	The cause-identifying number classified in the Tenth Revision of the International Classification of Diseases implemented by NCHS for deaths in 1999.
Infant Death:	The death of a live-born infant which occurs within the first year of life.

DEFINITIONS (Cont.)

Live Birth:	The complete expulsion or extraction of a product of human conception from its mother, irrespective of the duration of pregnancy, that, after such expulsion or extraction, shows any evidence of life such as breathing, heartbeat, pulsation of the umbilical cord, or voluntary muscle movement, whether or not the umbilical cord has been cut or the placenta attached.
Low Birth Weight:	Weight of a fetus or infant at delivery which is under 2,500 grams (less than five pounds, 8 ounces).
Marriage:	The legal union of a male and female.
Marriage Dissolution:	A marriage dissolved by either a divorce or an annulment.
Maternal Death:	The death of a mother caused by complications of pregnancy, childbirth and the puerperium.
Medical Procedure I:	Refers to use of the drug mifepristone as a pregnancy termination procedure.
Medical Procedure II:	Refers to use of the drug methotrexate as a pregnancy termination procedure.
Natural Increase:	Live births minus total deaths of a population within a given year.
Neonatal Death:	The death of a live-born infant which occurs prior to the twenty-eighth day of life.
Occurrence Data:	Vital statistics compiled on the basis of where the vital event happened.
Out-of-Wedlock Birth:	A birth occurring to a mother who is not married at the time of conception or at the time of birth or at any time between conception and birth.
Peer Group:	A group of counties with similar population densities in persons per square mile, as adopted by the Kansas Department of Health and Environment, Office of Local and Rural Health.
Perinatal Period III Death:	The aggregate total of fetal deaths (fetus weighs over 350 grams) and hebdomadal deaths (deaths that occur prior to the 7th day of life).

DEFINITIONS (Cont.)

Population Density:	The average number of inhabitants per square mile.
Prenatal Care:	Pregnancy-related health care services provided to a woman between conception and delivery.
Previous Pregnancy:	Includes all previous reported spontaneous Terminations, previous induced abortions, children born still living and children born now dead.
Puerperium:	Period of time after delivery, usually six to eight weeks, during which all maternal reproductive organs return to the normal pre-pregnancy condition.
Residence Data:	Vital statistics compiled on the basis of the usual place of residence of the person(s) to whom the vital event occurred.
Teenage Pregnancy:	A live birth, fetal death or abortion occurring to a female under 20 years of age.
Trimester:	A three-month period of time. First trimester care, for example, refers to care initiated in the first three months of pregnancy.
Very Low Birth Weight:	Weight of a fetus or infant at delivery which is under 1,500 grams (less than 3 pounds, 5 ounces).
Weeks Gestation:	The number of weeks between the last reported normal menses and the delivery of the fetus or infant.

RATES AND RATIOS

Abortion Ratio: $\frac{\text{induced abortions}}{\text{live births}} \times 1{,}000$

Age-Adjusted Death Rate: $\frac{\sum M_a P_a}{P} \times 1{,}000 \text{ or } 1000{,}000$

Where M_a = age-specific death rate per 1,000 or 100,000 population for a given age-group
P_a = standard population in a given age-group
P = total standard population

Age-Specific Death Rate: $\frac{\text{deaths in a specific age-group}}{\text{population in a specific age-group}} \times 1{,}000$

Age-Specific Fertility Rate: $\frac{\text{live births in a specific age-group}}{\text{female population in a specific age-group}} \times 1{,}000$

Birth Rate: $\frac{\text{live births}}{\text{total population}} \times 1{,}000$

Cause-Specific Death Rate: $\frac{\text{cause-specific deaths}}{\text{total population}} \times 100{,}000$

Death Rate: $\frac{\text{total deaths}}{\text{total population}} \times 1{,}000$

Divorce Rate: $\frac{\text{divorces}}{\text{total population}} \times 1{,}000$

Marriage Dissolution Rate: $\frac{\text{divorces and annulments}}{\text{total population}} \times 1{,}000$

Fertility Rate: $\frac{\text{live births}}{\text{female population 15-44}} \times 1{,}000$

Fetal Death Rate: $\frac{\text{fetal deaths}}{\text{live births + fetal deaths}} \times 1{,}000$

Hebdomadal Death Rate: $\frac{\text{hebdomadal deaths}}{\text{live births}} \times 1{,}000$

Infant Death Rate: $\frac{\text{infant deaths}}{\text{live births}} \times 1{,}000$

Marriage Rate: $\frac{\text{marriages}}{\text{total population}} \times 1{,}000$

RATES AND RATIOS (Cont.)

Maternal Death Rate:	$\frac{\text{maternal deaths}}{\text{live births}}$	x 10,000
Natural Increase Rate:	live birth rate minus total death rate	
Neonatal Death Rate:	$\frac{\text{neonatal deaths}}{\text{live births}}$	x 1,000
Out-of-Wedlock Birth Ratio:	$\frac{\text{out-of-wedlock births}}{\text{live births}}$	x 100
Perinatal Period III Death Rate:	$\frac{\text{perinatal period III deaths}}{\text{live births + fetal deaths}}$	x 1,000
Teenage Pregnancy Rate:	live births, fetal deaths, abortions for females $\frac{\text{in a specific age-group}}{\text{female population in a specific age-group}}$	x 1,000
Years of Potential Life Lost Rate	$\frac{\text{years of potential life lost}}{\text{population}}$	x 1,000

SYMBOLS AND ABBREVIATIONS

n.s.	not stated
n.a.	not available
n/a	not applicable
0.0	quantity or percent more than zero but less than 0.05.